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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/650,013

08/28/2003

Kazuya Fukuhara

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22852

7590

07/31/2006

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EXAMINER

AKANBI, ISIKA O

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 07/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/650,013

Applicant(s)

FUKUHARA ET AL.

Examiner

Isiaka O. Akanbi

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Amendment

The amendment file 11 May 2006 has been entered into this application. Claim 22 has been added.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-15 are rejected under 35 U.S.C. 101 the claimed invention is directed to non-statutory subject matter.

Claim 1 recites the limitation "inspecting an illumination axis offset the exposure apparatus based on a pattern obtained by developing the photosensitive substrate" merely inspection of an illumination axis offset the exposure apparatus based on a pattern obtained by developing the photosensitive substrate would not appear to be sufficient to constitute a tangible result, since the outcome of the inspection step has not been used in a disclosed practical application nor made available in such a manner that's its usefulness in a disclosed practical application can be realized. See OG Notices: 22 November 2005, "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility". Claims 2-15 are rejected to as being dependent upon a rejected base claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-10, 13 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Sato et al. (6,317,198 B1).

As regard to claim 1, Sato discloses an inspection method for an exposure apparatus for illuminating a photomask disposed on a first installation member by an illumination optical system (1), and for projecting an image of a pattern of the photomask (2) onto a substrate disposed on a second installation member (5) through a projection optical system (3), the inspection method comprising disposing an inspection photosensitive substrate as the substrate on the second installation member (col. 6, line 23-24), illuminating a first region (i.e. region before pupil) which does not include a pupil end of the projection optical system (3) and illuminating a second region (i.e. region after pupil) which includes the pupil end of the projection optical system (3) and which is not overlapped with the first region, before illuminating the first region or after illuminating the first region, in a state in which a surface of the photosensitive substrate (5) and a surface of secondary light source of the illumination optical system are optically conjugate with each other and inspecting an illumination axis offset of the exposure apparatus based on a pattern obtained by developing the photosensitive substrate (col. 6, line 1-53)(fig. 3a and 3b).

As to claim 2, according to claim 1, Sato discloses wherein the state in which the surface of the photosensitive substrate and the surface of the secondary light source of the illumination optical system are optically conjugate with each other is formed by providing a pattern member comprising a pattern formed on a surface between the illumination optical system (1) and the projection optical system (3) or between the projection optical system and the photosensitive substrate (col. 6, line 18-21).

As to claim 3, Sato discloses wherein the pattern member is an inspection photomask comprising a surface on which a pattern formed, and the inspection photomask is provided on the first installation member so that the surface of the inspection photomask is not optically conjugate with the surface of the projection substrate (fig. 3a and 3b).

As to claim 4, Sato discloses wherein the pattern of the inspection photomask includes a circular pattern transparent relative to an exposure light (fig. 5a and 5b).

As to claim 5, Sato discloses exposure apparatus inspection method comprising disposing the inspection photomask on the first installation member while the surface on which the circular pattern is provided is oriented toward the surface of the secondary light source to set the surface on which the circular pattern of the inspection photomask is formed and the

Art Unit: 2877

surface of the photosensitive substrate not to be optically conjugate with each other (col. 6, line 17-27).

As to claims 6, 10, Sato discloses wherein a diameter of the circular pattern is 40 μm or more and 80 μm or less (col. 7, line 1-2).

As to claim 7, Sato discloses wherein the inspection photomask is disposed on the first installation member so that the surface on which the circular pattern is formed directed toward a pupil of the projection optical system (fig. 3a and 3b).

As to claim 8, Sato discloses exposure apparatus inspection method comprising controlling a distance between the pupil of the projection optical system and the surface of the photosensitive substrate set the surface of the inspection photomask on which the circular pattern is formed and the surface of the photosensitive subtract not to be optically conjugate with each other (fig. 3a and 3b).

As to claim 9, Sato discloses wherein the photosensitive substrate comprising a transparent substrate relative to the exposure light and a reflection film (5) provided on a surface of the substrate opposite to a surface of the substrate on which the exposure light is incident and reflecting the exposure light (fig. 3a and 3b)

As to claim 13, Sato discloses an exposure apparatus inspection method comprising setting an illumination shape the secondary light source a zonal pattern by illuminating the second region when the photosensitive is exposed (col. 6, line 17-27)(fig. 3a and 3b).

As to claim 15, Sato discloses wherein the illumination shape of the secondary light source on a pupil surface of the projection optical system satisfies an inequality of $\text{NA}_{i1} > \text{NA}_{in} > \text{NA}_{i2}$, where NA_{in} an incident-side numerical aperture of the projection optical system, NA_{i1} is an emission-side numerical aperture of the illumination optical system, and NA_{i2} is a value representing an incident angle of a light corresponding to an inner periphery of the secondary light source by a numerical aperture dimension (col. 1, line 20-32).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (6,317,198 B1) as applied to claim 1, in view of the examiner Official Notice.

As to claim 11, the reference of Sato discloses the use of photoresist used as photosensitive material (col. 6, line 22-23), however the reference of Sato is silent with regard to the wafer used as being silicon. The examiner wishes to take Official Notice of the fact that the use of silicon wafer would have been well known. It would have been obvious to one having ordinary skill in the art at the time of invention to use silicon wafer substrates for the purpose of manufacturing electronic device or as optics, since these are well known silicon wafer used advantages.

Claims 12 and 14, and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (6,317,198 B1) in view of Hibbs et al. (5,973,771).

Claims 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over of Sato in view of Hibbs, as applied to claim 2 above. The reference of Sato discloses of the features of claim 2, comprising pattern member disposed in an optical path between the surface of the secondary light source of the illumination optical system (1) and the projection optical system (3) or in an optical path between the projection optical system and the photosensitive substrate (col. 6, line 22-24), however the reference of Sato is silent regarding the pattern member as being lens. The reference of Hibbs teaches of lens member between illumination optical system and the projection optical system (fig. 1). It would have been obvious to one having ordinary skill in the art at the time of invention to include a lens member as the pattern member for the purpose of creating patterns of the pupil illumination to enhance resolution and /or depth of focus.

As to claim 14, Sato discloses the claimed invention as applied to claimed 1 above except for is silent regarding setting an illumination shape of the secondary light source in a shape which has maximums of brightness in three or more directions when the photosensitive exposed. The reference of Hibbs discloses of setting an illumination shape of the secondary light source in a shape which has maximums of brightness three or more directions when the photosensitive substrate is exposed (col. 5, line 30-34). It would have been obvious to one having ordinary skill in the art at the time of invention to set an illumination shape of the secondary light source in a shape that has maximums of brightness in three or more directions

when the photosensitive substrate is exposed for the purpose of creating patterns of the pupil illumination to enhance resolution and /or depth of focus.

Claims 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (6,317,198 B1) in view of Hibbs et al. (5,973,771), and further in view of Sasaya et al. (6,262,793 B1).

Regarding claim 16, Sato discloses an exposure apparatus comprising a first installation member on which a photomask is disposed, an illumination optical system for illuminating (1) a pattern formed on the photomask disposed on the first installation member, a second installation member on which a substrate is disposed, a projection optical system (3) for projecting the image of the pattern of the photomask onto the substrate (5) disposed on the second installation member, however the reference of Sato is silent regarding a lens member arranged into an optical path between a surface of a secondary light source of the illumination optical system and the projection optical system or into an optical path between the projection optical system and the substrate. The reference of Hibbs discloses of a lens member arranged into an optical path between a surface of a secondary light source of the illumination optical system and the projection optical system (fig. 1). It would have been obvious to one having ordinary skill in the art at the time of invention to include a lens member arranged into an optical path between a surface of a secondary light source of the illumination optical system and the projection optical system for the purpose of creating patterns of the pupil illumination to enhance resolution and /or depth of focus. Further, Sasaya shows a lens member in an optical path between the projection optical system and the photosensitive substrate (fig. 14D). It would have been obvious to one having ordinary skill in the art at the time of invention to include a lens member as the pattern member between the projection optical system and the photosensitive substrate for the purpose of correcting the magnification error in the projection system.

As to claim 17, Sato, Hibbs and Sasaya disclose everything claimed, as applied 16 above, the reference of Sato is silent regarding the first lens member provided at a position away from an upper part a surface of the photomask by a predetermined distance in a direction perpendicular the surface of the photomask or provided at a position away from an upper part of a surface of the substrate by predetermined distance in a direction perpendicular to the surface of the substrate. The reference of Hibbs discloses the lens member provided at a position away

from an upper part a surface of the photomask by a predetermined distance in a direction perpendicular the surface of the photomask or provided at a position away from an upper part of a surface of the substrate by predetermined distance in a direction perpendicular to the surface of the substrate (fig. 1)(col. 2, line 48-67). It would have been obvious to one having ordinary skill in the art at the time of invention to provide the first lens member that is provided at a position away from an upper part a surface of the photomask by a predetermined distance in a direction perpendicular the surface of the photomask or provided at a position away from an upper part of a surface of the substrate by predetermined distance in a direction perpendicular to the surface of the substrate for the purpose of shaping and directing the light towards the wafer plane

As to claim 18, Sato, Hibbs and Sasaya disclose everything claimed, as applied above, the reference of Sato and Sasaya is silent regarding the predetermined distance is substantially equal to a focal length of the first lens member. The reference of Hibbs discloses the predetermined distance is substantially equal to a focal length of the first lens member (fig. 1)(col. 4, line 66-col. 5, line 1). It would have been obvious to one having ordinary skill in the art at the time of invention to provide predetermined distance that is substantially equal to a focal length of the first lens member for the purpose of creating patterns of the pupil illumination to enhance resolution and /or depth of focus.

As to claim 19, Sato, Hibbs and Sasaya disclose everything claimed, as applied above, the reference of Sato and Sasaya is silent regarding the first lens member comprising substrate including a main surface and a plurality of lenses provided on the main surface of the substrate, and disposed so that the main surface of the substrate is parallel to a surface of the photosensitive substrate. The reference of Hibbs discloses the first lens member comprising substrate including a main surface and a plurality of lenses provided on the main surface of the substrate, and disposed so that the main surface of the substrate is parallel to a surface of the photosensitive substrate (fig. 2). It would have been obvious to one having ordinary skill in the art at the time of invention to provide first lens member that comprises a substrate including a main surface and a plurality of lenses provided on the main surface of the substrate, and disposed so that the main surface of the substrate is parallel to a surface of the photosensitive substrate for the purpose of creating patterns of the pupil illumination to enhance resolution and /or depth of focus.

As to claim 20, Sato, Hibbs and Sasaya disclose everything claimed, as applied above, in addition Sato discloses a region of the main surface the substrate in which the plurality of lenses are not provided shields an exposure light (fig. 10) and (fig. 3 and 4).

As to claim 21, Sato, Hibbs and Sasaya discloses everything claimed, as applied above, in addition Sato discloses an exposure apparatus comprising a retraction member which retracts the lens member to an outside of an optical path of an exposure light (col. 7, line37-48)(fig. 3a and 3b).

As to claim 22, Sato, Hibbs and Sasaya disclose everything claimed, as applied above, the reference of Sato and Hibbs is silent regarding the first lens member comprising a convex lens. The reference of Hibbs Hibbs teaches of convex lens (2)(col. 18, line 2-3)(fig. 14D). It would have been obvious to one having ordinary skill in the art at the time of invention to provide the first lens member that comprises a convex lens for the purpose of correcting astigmatism.

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references listed in the attached form PTO-892 teach of other prior art an inspection method for an exposure apparatus that may anticipate or obviate the claims of the applicant's invention.

Conclusion

Official Notice

Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice. Applicant must seasonably challenge well known statements and statements based on personal knowledge. In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well-known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239

(CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged with rebutting the well-known statement in the next reply after the Office action in which the well-known statement was made. See MPEP 2144.03, paragraphs 4 and 6.

Response to Arguments

Applicant's arguments/remarks, see pages 7-12, filed 11 May 2006, with respect to the rejection(s) of claim(s) 1-10, 13 and 15 under 35 U.S.C. 102(b), the examiner disagrees with the applicant arguments, that Sato fails to disclose each and every element of claim 1. Sato does not disclose at least, Applicant's "illuminating a first region which does not include a pupil end of the projection optical system and illuminating a second region which includes the pupil end of the projection optical system and which is not overlapped with the first region before illuminating the first region or after illuminating the first region," as recited in claim 1. The reference of Sato discloses "illuminating a first region (i.e. region before pupil) which does not include a pupil end of the projection optical system (3) and illuminating a second region (i.e. region after pupil) which includes the pupil end of the projection optical system (3) and which is not overlapped with the first region, before illuminating the first region or after illuminating the first region (fig. 3a and 3b). As to Applicant's arguments, with respect to the rejection(s) of claim(s) 11, 12 and 14 under 35 U.S.C. 102(b), the examiner disagrees with the applicant arguments in view of the above claim 1 rejection(s) under 35 U.S.C. 102(b). With respect to the rejection(s) of claim(s) 16-21 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of claim amendment.

Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isiaka Akanbi whose telephone number is (571) 272-8658. The examiner can normally be reached on 8:00 a.m. - 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2877

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Isiaka Akanbi

July 22, 2006

A handwritten signature in black ink, appearing to read 'HWA (ANDREW) LEE', is positioned above the printed name and title.

HWA (ANDREW) LEE
PRIMARY EXAMINER